24/3/2018

Τμήμα Δημοτικής Εκπαίδευσης

πανεπιστημιο δυτικησ μακεδονιασ

Πληροφορική στην Εκπαίδευση

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# Human Ecology

## 1.1 The roots of ecology

The roots of ecology as a broader discipline can be traced to the Greeks and a lengthy list of developments in natural history science. Ecology also has notably developed in other cultures. Classic knowledge, as it is called, includes the human propensity for perceptive knowledge, clever relations, understanding, and for passing on information about the real world and the human experience. The term ecology was coined by Ernst Haeckel in 1866 and defined by direct reference to the economy of nature.

Like other contemporary researchers of his time, Haeckel adopted his terminology from Carl Linnaeus where human ecological connections were more evident. In his 1749 publication, Specimen academicum de oeconomia naturae, Linnaeus developed a science that included the economy and polis of nature. Polis stems from its Greek roots for a political community (originally based on the city-states), sharing its roots with the word police in reference to the promotion of growth and maintenance of good social order in a community. Linnaeus was also the first to write about the close affinity between humans and primates. Linnaeus presented early ideas found in modern aspects to human ecology, including the balance of nature while highlighting the importance of ecological functions (ecosystem services or natural capital in modern terms): "In exchange for performing its function satisfactorily, nature provided a species with the necessaries of life: 66 The work of Linnaeus influenced Charles Darwin and other scientists of his time who used Linnaeus' terminology (i.e., the economy and polis of nature) with direct implications on matters of human affairs, ecology, and economics.

## 1.2The history of human biological

Ecology is not just biological, but a human science as well. An early and influential social scientist in the history of human ecology was Herbert Spencer. Spencer was influenced by and reciprocated his influence onto the works of Charles Darwin. Herbert Spencer coined the phrase "survival of the fittest", he was an early founder of sociology where he developed the idea of society as an organism, and he created an early precedent for the socio-ecological approach that was the subsequent aim and link between sociology and human ecology.

## 1.3The economy of nature

Τhe history of human ecology has strong roots in geography and sociology departments of the late 19th century. In this context a major historical development or landmark that stimulated research into the ecological relations between humans and their urban environments was founded in George Perkins Marsh's book Man and Nature; or, physical geography as modified by human action, which was published in 1864. Marsh was interested in the active agency of human-nature interactions (an early precursor to urban ecology or human niche construction) in frequent reference to the economy of nature.

In 1894, an influential sociologist at the University of Chicago named Albion W. Small, collaborated with sociologist George E. Vincent and published a "‘‘laboratory guide’’ to studying people in their ‘‘every-day occupations.’’" This was a guidebook that trained students of sociology how they could study society in a way that a natural historian would study birds. Their publication "explicitly included the relation of the social world to the material environment."

# Ecosystem Ecology

## 2.1 Ecological mechanisms

Ecosystem ecology examines physical and biological structures and examines how these ecosystem characteristics interact with each other. Ultimately, this helps us understand how to maintain high quality water and economically viable commodity production. A major focus of ecosystem ecology is on functional processes, ecological mechanisms that maintain the structure and services produced by ecosystems. These include primary productivity (production of biomass), decomposition, and trophic interactions.

Studies of ecosystem function have greatly improved human understanding of sustainable production of forage, fiber, fuel, and provision of water. Functional processes are mediated by regional-to-local level climate, disturbance, and management. Thus ecosystem ecology provides a powerful framework for identifying ecological mechanisms that interact with global environmental problems, especially global warming and degradation of surface water.

## 2.2 Characteristics

These characteristics also introduce practical problems into natural resource management. Who will manage which ecosystem? Will timber cutting in the forest degrade recreational fishing in the stream? These questions are difficult for land managers to address while the boundary between ecosystems remains unclear; even though decisions in one ecosystem will affect the other. We need better understanding of the interactions and interdependencies of these ecosystems and the processes that maintain them before we can begin to address these questions.

## 2.3 Physiological ecology

Ecosystem ecology is an inherently interdisciplinary field of study. An individual ecosystem is composed of populations of organisms, interacting within communities, and contributing to the cycling of nutrients and the flow of energy. The ecosystem is the principal unit of study in ecosystem ecology.

Population, community, and physiological ecology provide many of the underlying biological mechanisms influencing ecosystems and the processes they maintain. Flowing of energy and cycling of matter at the ecosystem level are often examined in ecosystem ecology, but, as a whole, this science is defined more by subject matter than by scale. Ecosystem ecology approaches organisms and abiotic pools of energy and nutrients as an integrated system which distinguishes it from associated sciences such as biogeochemistry.

# Behavioral Ecology

## 3.1 Male social status

When males' only contribution to offspring is their sperm, females are particularly choosy. With this high level of female choice, sexual ornaments are seen in males, where the ornaments reflect the male's social status. Two hypotheses have been proposed to conceptualize the genetic benefits from female mate choice.

First, the good genes hypothesis suggests that female choice is for higher genetic quality and that this preference is favored because it increases fitness of the offspring. This includes Zahavi's handicap hypothesis and Hamilton and Zuk's host and parasite arms race. Zahavi's handicap hypothesis was proposed within the context of looking at elaborate male sexual displays. He suggested that females favor ornamented traits because they are handicaps and are indicators of the male's genetic quality. Since these ornamented traits are hazards, the male's survival must be indicative of his high genetic quality in other areas. In this way, the degree that a male expresses his sexual display indicates to the female his genetic quality. Zuk and Hamilton proposed a hypothesis after observing disease as a powerful selective pressure on a rabbit population. They suggested that sexual displays were indicators of resistance of disease on a genetic level.

## 3.2 The female preference spread

Such 'choosiness' from the female individuals can be seen in wasp species too, especially among Polistes dominula wasps. The females tend to prefer males with smaller, more elliptically shaped spots than those with larger and more irregularly shaped spots. Those males would have reproductive superiority over males with irregular spots.

Fisher's hypothesis of runaway sexual selection suggests that female preference is genetically correlated with male traits and that the preference co-evolves with the evolution of that trait, thus the preference is under indirect selection. Fisher suggests that female preference began because the trait indicated the male’s quality. The female preference spread, so that the females’ offspring now benefited from the higher quality from specific trait but also greater attractiveness to mates. Eventually, the trait only represents attractiveness to mates, and no longer represents increased survival.

## 3.3 Example

An example of mate choice by genes is seen in the cichlid fish Tropheus moorii where males provide no parental care. An experiment found that a female T. moorii is more likely to choose a mate with the same color morph as her own. In another experiment, females have been shown to share preferences for the same males when given two to choose from, meaning some males get to reproduce more often than others

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| --- | --- | --- | --- | --- |
| LESSON | TOPIC | ASSIGNMENT | Points | DUE |
| 1 | What is distance Learning? | Wiki#1 | 10 | March 10 |
|  |  | Presentation | 20 |  |
| 2 | Histories &Theories | Brief paper | 20 | March 24 |
|  |  | Spring Break |  |  |
| 3 | Distance  Learners | Discussion #1 | 10 | April 7 |
|  |  | Group Project | 50 | April 14 |
| 4 | Media Selection | Blog #1 | 10 | April 21 |

Complex Table (less accessible)

Class Schedule

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# Urban Ecology

## 4.1 Ecological process

Urban ecology is a recent field of study compared to ecology as a whole. The methods and studies of urban ecology are similar to and comprise a subset of ecology. The study of urban ecology carries increasing importance because more than 50% of the world's population today lives in urban areas. At the same time, it is estimated that within the next forty years, two-thirds of the world's population will be living in expanding urban centers. The ecological processes in the urban environment are comparable to those outside the urban context. However, the types of urban habitats and the species that inhabit them are poorly documented. Often, explanations for phenomena examined in the urban setting as well as predicting changes because of urbanization are the center for scientific research.

Urbanization results in a large demand for chemical use by industry, construction, agriculture, and energy providing services. Such demands have a substantial impact on biogeochemical cycles, resulting in phenomena such as acid rain, eutrophication, and global warming. Furthermore, natural biogeochemical cycles in the urban environment can be impeded due to impermeable surfaces that prevent nutrients from returning to the soil, water, and atmosphere.

## 4.2 Agricultural

Demand for fertilizers to meet agricultural needs exerted by expanding urban centers can alter chemical composition of soil. Such effects often result in abnormally high concentrations of compounds including sulfur, phosphorus, nitrogen, and heavy metals. In addition, nitrogen and phosphorus used in fertilizers have caused severe problems in the form of agricultural runoff, which alters the concentration of these compounds in local rivers and streams, often resulting in adverse effects on native species. A well-known effect of agricultural runoff is the phenomenon of eutrophication. When the fertilizer chemicals from agricultural runoff reach the ocean, an algal bloom results, then rapidly dies off. The dead algae biomass is decomposed by bacteria that also consume large quantities of oxygen, which they obtain from the water, creating a "dead zone" without oxygen for fish or other organisms. A classic example is the dead zone in the Gulf of Mexico due to agricultural runoff into the Mississippi River.

Just as pollutants and alterations in the biogeochemical cycle alter river and ocean ecosystems, they exert likewise effects in the air. Smog stems from the accumulation of chemicals and pollution and often manifests in urban settings, which has a great impact on local plants and animals. Because urban centers are often considered point sources for pollution, unsurprisingly local plants have adapted to withstand such conditions.

## 4.3 Greenhouse gases

Urban environments and outlying areas have been found to exhibit unique local temperatures, precipitation, and other characteristic activity due to a variety of factors such as pollution and altered geochemical cycles. Some examples of the urban effects on climate are urban heat island, oasis effect, greenhouse gases, and acid rain. This further stirs the debate as to whether urban areas should be considered a unique biome. Despite common trends among all urban centers, the surrounding local environment heavily influences much of the climate. One such example of regional differences can be seen through the urban heat island and oasis effect.

# Political Ecology

## 5.1 The academic discipline

Political ecology is the study of the relationships between political, economic and social factors with environmental issues and changes. Political ecology differs from apolitical ecological studies by politicizing environmental issues and phenomena.

The academic discipline offers wide-ranging studies integrating ecological social sciences with political economy in topics such as degradation and marginalization, environmental conflict, conservation and control, and environmental identities and social movements.

## 5.2 Cultural ecological

Political ecology’s movement as a field since its inception in the 1970s has complicated its scope and goals. Through the discipline’s history, certain influences have grown more and less influential in determining the focus of study. Peter A. Walker traces the importance of the ecological sciences in political ecology. He points to the transition, for many critics, from a ‘structuralist’ approach through the 1970s and 1980s, in which ecology maintains a key position in the discipline, to a 'poststructuralist' approach with an emphasis on the 'politics' in political ecology. This turn has raised questions as to the differentiation with environmental politics as well as the field’s use of the term of 'ecology'. Political ecological research has shifted from investigating political influence on the earth's surface to the focus on spatial-ecological influences on politics and power—a scope reminiscent of environmental politics.

Much has been drawn from cultural ecology, a form of analysis that showed how culture depends upon, and is influenced by, the material conditions of society (political ecology has largely eclipsed cultural ecology as a form of analysis according to Walker.)[12] As Walker states, "whereas cultural ecology and systems theory emphasize[s] adaptation and homeostasis, political ecology emphasize[s] the role of political economy as a force of maladaptation and instability".

## 5.3 The political Economy

Political ecologists often use political economy frameworks to analyze environmental issues. Early and prominent examples of this were The Political Economy of Soil Erosion in Developing Countries by Piers Blaikie in 1985, which traced land degradation in Africa to colonial policies of land appropriation, rather than over-exploitation by African farmers, and Silent Violence: Food, Famine and Peasantry in Northern Nigeria by Michael Watts in 1983, which traced the famine in northern Nigeria during the 1970s to the effects of colonialism, rather than an inevitable consequence of the drought in the Sahel.

# Η Οικογένειά μου

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